

What is claimed is:

1 A process for preparing an essentially non-absorbable very high molecular weight sulfated polysaccharide having a sulfate to monomer ratio of from 1.0 to 3.0, containing less than about 5.0 wt. percent of sulfated polysaccharides having a molecular weight less than 75,000 Daltons, and containing less than 0.5 weight percent of inorganic sulfate, comprising the steps;

(a) admixing water with a dry crude high molecular weight sulfated polysaccharide to create a crude aqueous sulfated polysaccharide solution;

(b) filtering the crude aqueous sulfated polysaccharide solution in a first filtration step to produce a filtrate; and

(c) diafiltering the filtrate of step (b) against water using a membrane having a molecular weight cut-off of 500,000 or greater to produce a purified very high molecular weight sulfated polysaccharide.

2. The method of claim 1 wherein the dry high molecular weight sulfated polysaccharide is a sulfated cellulose prepared by the further steps comprising:

(i) admixing cellulose with anhydrous DMF to provide a cellulose/anhydrous DMF mixture;

(ii) adding a sulfur trioxide/DMF complex to the cellulose/anhydrous DMF mixture to provide a cellulose reaction mixture and allowing the cellulose reaction mixture to react for a period of time sufficient to give a sulfated cellulose;

(iii) separating the sulfated cellulose from the cellulose reaction mixture;

(iv) washing the sulfated cellulose; and

(v) drying the sulfated cellulose to give a dry crude high molecular weight sulfated polysaccharide.

3. The process of claim 1 wherein filtering step (b) includes successive filtration ending with a 1 micron filter.

4. The process of claim 1 wherein the purified very high molecular weight sulfated polysaccharide is dried and mixed with at least one pharmaceutical excipient to provide a powdered therapeutic agent.

5. The process of claim 4 wherein the powdered therapeutic agent is formed into a pharmaceutically acceptable dosage form.

6. The process of claim 1 wherein the purified very high molecular weight sulfated polysaccharide is incorporated into a foodstuff.

7. A process for preparing a purified very high molecular weight sulfated polysaccharide having a sulfate to monomer ratio of from 1.0 to 3.0, containing less than about 5.0 wt. percent of sulfated polysaccharides having a molecular weight less than 75,000 Daltons, and containing less than 0.5 wt % free sulfates comprising the steps of:

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- (a) milling dried cotton linters to provide shredded cotton linters;
  - (b) soaking the shredded cotton linters in anhydrous DMF to provide a cotton linter suspension;
  - (c) adding a DMF/sulfur trioxide complex to the cotton linter suspension to provide a sulfation reaction mixture and allowing the sulfation reaction mixture to react until the
- 10 sulfation reaction is essentially complete;

(d) adding an aqueous base to the sulfation reaction mixture to create a crude sulfated polysaccharide mixture including crude sulfated polysaccharides and aqueous reactants;

(e) separating the crude sulfated polysaccharides from DMF and the aqueous reactants by washing the crude sulfated polysaccharide mixture with an appropriate organic solvent, such as acetone;

(f) adding water to make an aqueous crude sulfated polysaccharide mixture;

(g) filtering the aqueous crude sulfated polysaccharide mixture to provide a first crude filtered sulfated polysaccharide; and

(f) diafiltering the first crude filtered sulfated polysaccharide to provide a purified very high molecular weight sulfated polysaccharide.

8. The process of claim 7 wherein the diafiltering step is conducted with a membrane having a molecular weight cut-off of 500,000 Daltons or greater.

9. The method of claim 7 wherein the sulfation reaction mixture is maintained at a temperature of from 13° C to 20°C.

10. The process of claim 7 wherein filtering step (g) includes two or more filtration steps, each filtration step using a filter with a smaller pore size than used in the prior filtration step.

11. An essentially non-absorbable high molecular weight sulfated polysaccharide having a sulfate to monomer ratio of about 2, containing less than 5.0 weight percent of sulfated polysaccharides having a molecular weight less than 75,000 Daltons, and containing less than 0.5 weight percent free sulfates, and having an average molecular weight greater than 2,000,000 Da prepared by the steps comprising:

(a) milling dried cotton linters to provide shredded cotton linters;  
(b) soaking the shredded cotton linters in anhydrous DMF to provide a cotton linter suspension;

(c) adding a DMF/sulfur trioxide complex to the cotton linter suspension to provide a sulfation reaction mixture at sulfation reaction conditions including a reaction temperature below 20°C and allowing the sulfation reaction mixture to react until the sulfation reaction is essentially complete;

(d) adding an aqueous base to the sulfation reaction mixture to create a crude sulfated polysaccharide mixture including crude sulfated polysaccharides and aqueous reactants;

(e) separating the crude sulfated polysaccharides from DMF and the aqueous reactants by washing the crude sulfated polysaccharide mixture with an appropriate organic solvent, such as acetone;

(f) adding water to make an aqueous crude sulfated polysaccharide mixture;

(g) filtering the aqueous crude sulfated polysaccharide mixture to provide a first crude filtered sulfated polysaccharide; and

(f) diafiltering the first crude filtered sulfated polysaccharide with a membrane having a molecular weight cut-off of 500,000 Daltons or greater to provide a purified very high molecular weight sulfated polysaccharide.

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